



PEACE/WILLISTON
FISH & WILDLIFE
COMPENSATION
PROGRAM

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Fish Habitat Enhancement Potential And Stocking Assessment Of Lower Manson Lake

A. R. McLean
1991

PFWWCP Report No. 120

The Peace/Williston Fish & Wildlife Compensation Program is a cooperative venture of BC Hydro and the provincial fish and wildlife management agencies, supported by funding from BC Hydro. The Program was established to enhance and protect fish and wildlife resources affected by the construction of the W.A.C. Bennett and Peace Canyon dams on the Peace River, and the subsequent creation of the Williston and Dinosaur Reservoirs.

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**This report has been approved by the Peace/Williston Fish and Wildlife
Compensation Program Fish Technical Committee.**

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LOWER MANSON LAKE

WATERSHED: Parsnip River
DATE OF SURVEY: July 6. 7. 1991
FIELD CREW LEADER: A.R. McLean
FIELD ASSISTANT: J. Dionne

PEACE FISHERIES COMPENSATION PROGRAM

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FISH AND WILDLIFE BRANCH

REPORT PREPARED BY: A.R. McLean

Lake: **LOWER MANSON**

INTRODUCTION

A standard fisheries baseline reconnaissance of Lower Manson Lake was carried out by the Fish and Wildlife Branch (Prince George) in August of 1979. The report is on file at the Ministry of Environment, Fish and Wildlife Branch in Prince George.

Lower Manson Lake (Plate #1) was investigated in July of 1991 by the Peace Fisheries Compensation Program to identify potential fisheries enhancement projects.

LOCATION

Location:	85 km northwest of Mackenzie	
Elevation:	865 m +/-	
Latitude/Longitude:	55°35'32":124°20'20"	U.T.M.: 10.4155.61615
Management Unit:	7-28	N.T.S. Map No.: 93 N/9 (edition 2)
Drainage:	Manson R. --> Williston Reservoir (Parsnip Reach) --> Peace R.	

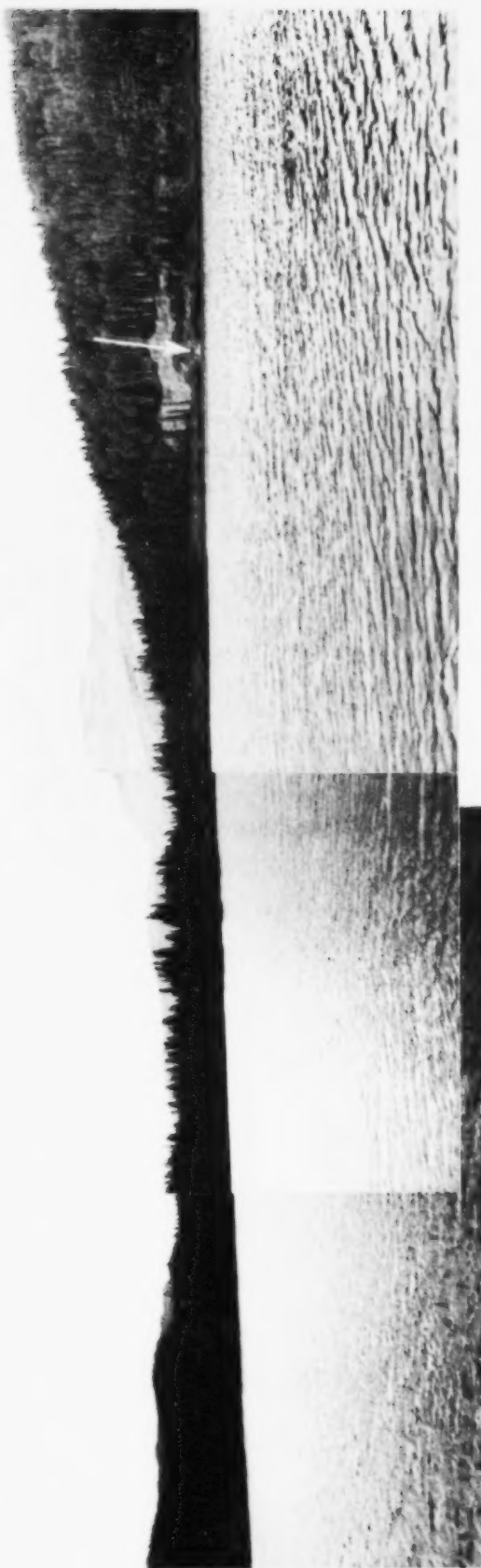


Plate 1: Panoramic view of Lower Manson Lake (Upper Basin) looking north northeast. Arrow indicates access point.

Lake: **LOWER MANSON**

METHODS

One sinking monofilament gill net (approx. 15 hour set) and two minnow traps (approx. 18 and 16 hour sets) were set to determine relative abundance and identification of fish species in Lower Manson Lake (See Appendix 1 for net set details) (See figure 1 for net set locations).

Sportfish species were sampled for length, weight, sex, maturity, stomach contents and parasite/disease presence (Appendix 2). Scale samples were collected for age determination. The total catch and size range of coarse fish species captured during the investigation was also recorded.

The fisheries enhancement potential of any inlets or outlets was determined through visual observation and recording of physical data, using standard methodologies outlined in the Fish/Habitat Inventory and Information Program (1987 Stream Survey Field Guide).

On site anglers were interviewed opportunistically. Salmonid catch per unit effort information was recorded from these anglers and angling undertaken by program staff.

The benchmark set during the initial study (1979) was located (figure 1). Any change in water level was measured using an elson tape, in combination with an abney level.

Photo documentation of the investigation was also completed (see figure 1 for photo locations).

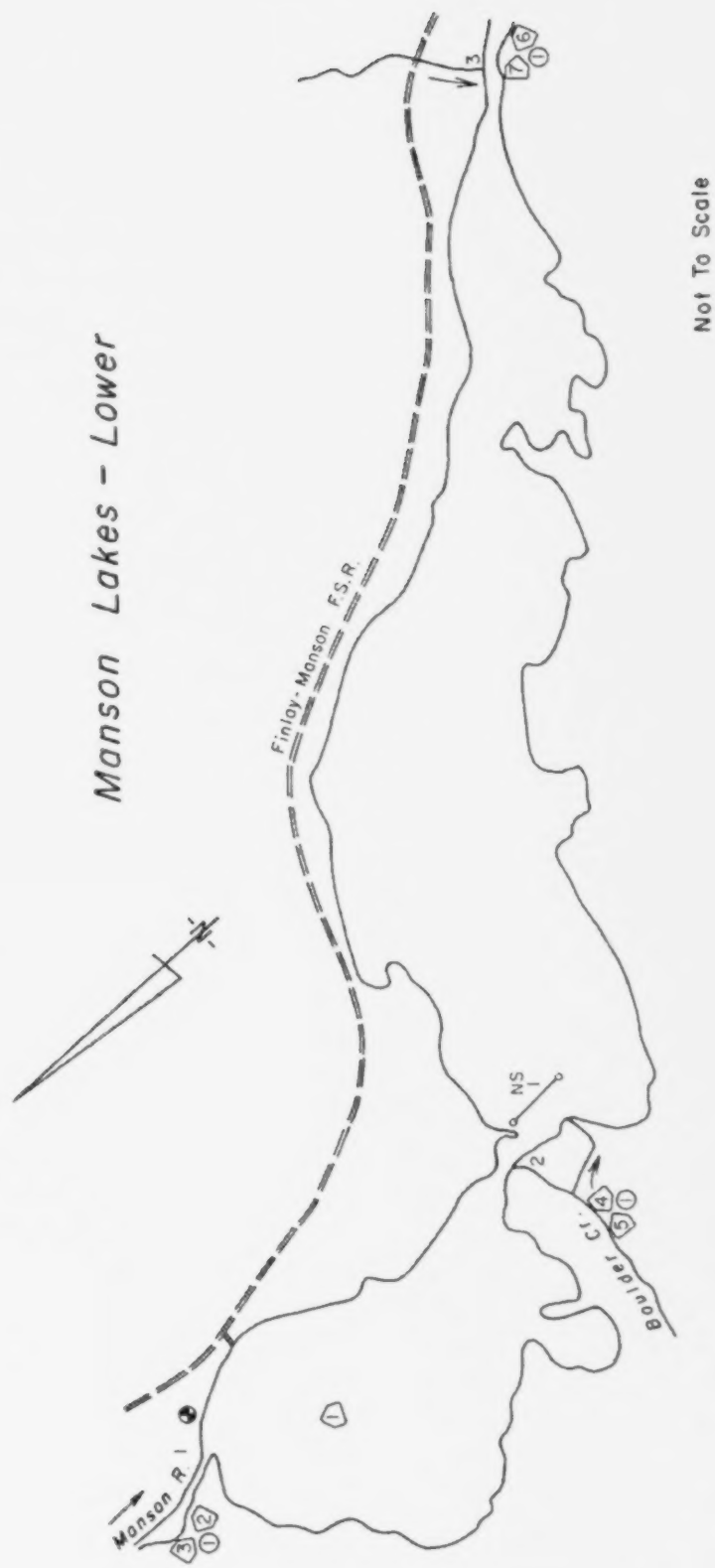


Figure 1

Lake: **LOWER MANSON**

RESULTS & DISCUSSIONS

One overnight net set yielded 1 rainbow trout, 5 lake trout, 2 lake whitefish, 4 mountain whitefish, 3 pygmy whitefish, 8 longnose sucker, 2 coarse sucker, 15 peamouth chub, 1 sculpin and 3 northern squawfish (table 2). Two minnow traps yielded 5 sculpins (table 3).

TABLE 2
LAKE CATCH SUMMARY

Species	Net Site Number				Angled	Other	Total	Number Sampled	Number Preserved	Size Range (cm)
	1	2	3	4						
rainbow trout	1				16		17	17		12.0 - 38.2
lake trout	5						5	5		43.8 - 76.0
bull trout	-				5		5	5		31.0 - 32.9
lake whitefish	2						2	2		24.6 - 30.3
mountain whitefish	4				9		13	9		11.8 - 26.8
pygmy whitefish	3				1		4	4		20.6 - 26.8
longnosesucker	8						8			12.2 - 38.0
coarse sucker	2						2			35.8 - 36.9
peamouth chub	15						15			10.3 - 11.8
sculpin	1						1			8.4
northern squawfish	3				1		4			15.3 - 22.8

TABLE 3
MINNOW TRAP CATCH

f	Hours	Depth (m)	Substrate	Species	Size Range (cm)
1	18	0.6	organics	5 sculpin	7.1 - 12.5
2	16	0.7	organics/cobble/boulder	nil	

Bait: Sardines

Lake: **LOWER MANSON**

DRAINAGE

Manson R. - inlet #1 (Plate #2, #3)

Manson River flows into the north end of Lower Manson Lake. The initial 200 m of the river was investigated. Approximately 200 m upstream from the lake, the average wetted width was 22 m, average depth was 0.5 m, gradient was 0.2% (estimate), and water temperature was 14°C. Good salmonid spawning (15% fines) and rearing habitat (undercut banks, overstream vegetation, LOD) was observed.

See point sample card for additional information (Appendix 3).



Plate #2: Upstream view of inlet (Manson River), taken approx. 200 m upstream from lake.

Lake: LOWER MANSON



Plate #3: Downstream view of inlet (Manson River),
taken approx. 200 m upstream from lake.

Boulder C. - inlet #2 (Plate #4, #5)

Boulder Creek flows into the channel separating the 2 basins of Lower Manson Lake. The initial 150 m of the inlet was investigated. Approximately 150 m upstream from the lake, the creek had an average wetted width of 5.6 m, average depth of 35 cm, average gradient of 0.1 % (estimate), and a water temperature of 8°C. Good spawning habitat was noted between 120 m and 150 m upstream from the lake. Good rearing habitat was noted throughout (overstream vegetation, LOD, undercut banks, instream vegetation).

See point sample card for additional information (Appendix 3).

Lake: **LOWER MANSON**



Plate 4: Upstream view of Boulder Creek, taken approx.
150 m upstream from lake.



Plate 5: Downstream view of Boulder Creek, taken
approx. 150 m upstream from lake.

Lake: **LOWER MANSON**

Unnamed C. - inlet #3

Unnamed Creek is located approx. 80 m downstream from the lake. The initial 100 m were investigated. The creek had an average wetted width of 1.0 m, average depth of 10 cm, and a water temperature of 11.5°C. Limited amounts of spawning gravel were observed.

Manson R. - outlet (Plate #6, #7)

Manson River is located at the south end of Lower Manson Lake. The initial 200 m of the river was investigated. Approximately 100 m downstream from the lake, the river had an average wetted width of 22 m, average depth of 0.7 m and an average gradient of 0.2% (estimate). Good spawning and rearing habitat (undercut banks, LOD, overstream vegetation) was observed throughout.

See point sample card for additional information (Appendix 3).



Plate #6: Upstream view of outlet (Manson River),
taken approx. 200 m downstream from lake.

Lake: **LOWER MANSON**



Plate #7: Downstream view of outlet (Manson River), taken approx. 200 m downstream from lake.

ANGLER USE AND CATCH PER UNIT EFFORT

Angling effort was undertaken by program staff. Two people fishing for 7.5 hours yielded 16 rainbow trout, 5 bull trout, 10 whitefish, and 1 northern squawfish. Angler success was very poor on the lake, with the exception of the inlet/outlet areas.

BENCHMARK

The original benchmark set in 1979 was located in a 30 cm diameter spruce tree, approx. 5.2 m from the lake and approx. 70 m north of the access point. The benchmark is 1.85 m above current lake level. A 15 cm rise in lake level is apparent. The benchmark was repainted (orange).

MISCELLANEOUS COMMENTS

Redds were observed 200 m upstream from the lake on inlet #1 (Manson R.) and in the initial 200 m of the outlet (Manson R.).

Lake: **LOWER MANSON**

RESORTS AND CAMPSITES

A B.C. Forest Service Recreation Site located at Upper Manson Lake attracts anglers which fish both lakes.

A primitive campsite and boat launch are located on the north shore of Lower Manson Lake.

FISHERIES MANAGEMENT COMMENTS

One overnight net set yielded 1 rainbow trout, 5 lake trout, 2 lake whitefish, 4 mountain whitefish, 3 pygmy whitefish, and 5 species of coarse fish including northern squawfish (indicative of the 1979 netting results). Two people fishing for 7.5 hours yielded 16 rainbow trout (average length 26.5 cm (12.0 - 38.2 cm), average weight 233 grams (50 - 610 grams)), 5 bull trout, 10 whitefish and 1 northern squawfish. Angling success on the lake was very poor, with the exception of the inlets/outlet areas. Lower Manson Lake is divided into 2 basins. Inlet #1 and the outlet are sections of the Manson River. The inlets and outlet provide good spawning and rearing habitat. The low densities of rainbow trout captured during the investigation may be related to the limited littoral area in Lower Manson Lake. A B.C. Forest Service Recreation Site located at Upper Manson Lake attracts anglers which fish both lakes.

No physical enhancements were identified or are necessary at this time. Continued monitoring of wild stocks is recommended. A fisheries evaluation may be warranted in the future as a kokanee populations may result from the Manson River kokanee stocking program initiated in 1990.

Lake: **LOWER MANSON**

APPENDIX 1

Lake: **LOWER MANSON**

NETTING RECORD

Number of panels: 6

Individual panel length: 15.2 m

Mesh sizes experimental order: 25, 76, 51, 89, 38, 64 mm

NETTING SITE #1

Type:	Sinking monofilament		
Date Set:	July 6, 1991	Time:	1952hrs
Date Lifted:	July 7, 1991	Time:	1100 hrs
Net Dimensions:	Length: 91.4 m	Depth:	2.4 m
Shallow End Mesh Size:	25 mm	Depth:	1.0 m
		Substrate:	cobble
Deep End Mesh Size:	64 mm	Depth:	32 m
		Substrate:	cobble

Comments:

Lake trout caught in second and third panel from shore (↓ 7 m).

Lake: LOWER MANSON

APPENDIX 2

Lake: **LOWER MANSON**

INDIVIDUAL FISH DATA

Date Captured: July 6, 7, 1991

M - Male
F - Female
? - Not
Obvious

IMM - Immature
MG - Maturing
MT - Mature
GV - Gravid
SP - Spent
? - Not Obvious

EG - Egg
FR - Fin Ray
HD - Head
ML - Milt
OT - Otolith

SC - Scale
ST - Stomach
TG - Fish Tag
WF - Whole Fish

Method of Capture: sinking monofilament gillnet

SPECIES	Fork Length (cm)	Weight (grams)	Sex	Gonadal Maturity	Sample Type	Age (yr)	Stomach Contents				Comments
							Plankton	Insects	Fish	Other	
pygmy whitefish	26.8	260	M	MT	SC	5				unidentified material	
pygmy whitefish	27.2	260	M	MG	SC	5				unidentified material	
pygmy whitefish	32.3	400	F	MT	SC	6				unidentified material	
lake trout	43.8	910	M	MG	OT	7				empty	
lake trout	46.3	1,020	F	MG	OT	10				empty	
lake trout	52.0	1,700	M	MT	OT	18				empty	
lake trout	58.2	2,200	-	-	FR	14					
lake trout	76.0	4,500	-	-	FR	21					
lake whitefish	24.6	200	M	MT	SC	7				detritus	
lake whitefish	30.3	410	F	MT	SC	9		beetle		detritus	
rainbow trout	12.0										

AGE DETERMINATION COMPLETED BY:

Margaret MacDonald, Box 243, Midway, B.C.

Lake: LOWER MANSON

INDIVIDUAL FISH DATA

Date Captured: July 7, 1991

M - Male
F - Female
? - Not
Obvious

IMM - Immature
MG - Maturing
MT - Mature
GV - Gravid
SP - Spent
? - Not Obvious

EG - Egg
FR - Fin Ray
HD - Head
ML - Milt
OT - Otolith

SC - Scale
ST - Stomach
TG - Fish Tag
WF - Whole Fish

Method of Capture: angled

Species	Fork Lgth (cm)	Wght (g)	Sex	Gonadal maturity	Sample Type	Age (yr)	Stomach Contents				Comments
							Plankton	Insects	fish	Other	
rainbow trout	20.8	50	-	-	SC	3+					
rainbow trout	21.5	110	M	MG	SC	2+		unidentified insects		detritus	
rainbow trout	23.8	180	-	-	SC	3+					
rainbow trout	25.5	200	-	-	SC	3+					
rainbow trout	28.6	205	-	-	SC	3+					
rainbow trout	29.0	-	-	-	SC	3+					
rainbow trout	29.4	200	-	-	SC	4+					
rainbow trout	31.0	-	-	-	SC	3+					
rainbow trout	31.9	360	-	-	SC	4+					
rainbow trout	32.0	250	-	-	SC	-					
rainbow trout	34.0	460	-	-	SC	4+					
bull trout	23.7	145	-	-	SC	3+					
bull trout	30.9	230	-	-	SC	4+					
bull trout	32.7	360	-	-	SC	4+					
mountain whitefish	18.2	60	M	MG	SC	3+		unidentified insects		tapeworms	
mountain whitefish	20.0	60	-	-	SC	3+					
mountain whitefish	20.6	100	-	-	SC	3+					
mountain whitefish	23.0	140	-	-	SC	5+					
mountain whitefish	23.8	140	-	-	SC	4+					
mountain whitefish	24.0	160	-	-	SC	6+					
mountain whitefish	25.7	210	-	-	SC	7+					

AGE DETERMINATION COMPLETED BY:

Margaret MacDonald, Box 243, Midway, B.C.

Lake: **LOWER MANSON**

INDIVIDUAL FISH DATA

Date Captured: July 6, 7, 1991

M - Male
F - Female
? - Not
Obvious

IMM - Immature
MG - Maturing
MT - Mature
GV - Gravid
SP - Spent
? - Not Obvious

EG - Egg
FR - Fin Ray
HD - Head
ML - Milt
OT - Otolith

SC - Scale
ST - Stomach
TG - Fish Tag
WF - Whole Fish

Method of Capture: angled

SPECIES	Fork Length (cm)	Weight (grams)	Sex	Gonadal Maturity	Sample Type	Age (yr)	Stomach Contents				Comments
							Plankton	Insects	Fish	Other	
rainbow trout	19.8	100	-	-	SC	2+					
rainbow trout	20.6	110	M	IMM	SC	3+				detritus	
rainbow trout	26.0	210	F	MG	SC	3+		beetles		detritus	
rainbow trout	26.9	220	-	-	SC	3+					
rainbow trout	38.2	610	F	MG	SC	5+		beetles		detritus	
bull trout	31.0	310	-	-	SC	4+					
bull trout	32.9	390	-	-	SC	4+					
mountain whitefish	15.8	40	M	IMM	SC	2+				detritus	
mountain whitefish	26.8	280	-	-	SC	7+					fish was released
pygmy whitefish	20.6	100	-	-	SC	4+					fish was released

AGE DETERMINATION COMPLETED BY:

Margaret MacDonald, Box 243, Midway, B.C.

Lake: LOWER MANSON

APPENDIX 3

Lake: **LOWER MANSON**

System Name: **Manson River** **inlet #1**

Site Location: 200 m upstream from Lower Manson Lake

Date:	July 6, 1991	Time:	1200 hrs
Channel Width:	22 m	Water Temp.:	14 °C
Wetted Width:	22 m	Stage (flow):	moderate
Max. Depth:	0.9 m	Velocity:	1m/sec
Avg. Depth:	0.5 m	Field Gradient:	0.2 %
Turbidity:	0.9 m	Colour:	slight tannic

Flood Signs:

Height: --

Type: --

Substrate Breakdown:

Fines	Small Gravel	Large Gravel	Cobble
15 %	5 %	45 %	35 %
Boulder	Bedrock		
-- %	-- %		

Substrate Compaction: low Sand: 30 %

Banks:

	Form	Height	Stability
Right	undercut	0.6 m	stable due to rooted vegetation
Left	straight	1.2 m	stable due to rooted vegetation

Comments:

Good salmonid spawning habitat throughout the 200 m investigated (15% fines).
Redds noted 200 m upstream from lake.
Good rearing habitat available (undercut banks, overstream vegetation, LOD).

Lake: **LOWER MANSON**

System Name: **Boulder Creek** **inlet #2**

Site Location: 150 m upstream from Lower Manson Lake

Date:	July 6, 1991	Time:	1530 hrs
Channel Width:	5.6 m	Water Temp.:	8° C
Wetted Width:	5.6 m	Stage (flow):	moderate
Max. Depth:	0.8 m	Velocity:	0.5 m/sec
Avg. Depth:	0.35 m	Field Gradient:	0.1 % (estimate)
Turbidity:	80 cm	Colour:	gin clear

Flood Signs:

Height: 0.4 m
Type: vegetation on tree

Substrate Breakdown:

Fines	Small Gravel	Large Gravel	Cobble
15 %	19 %	70 %	--
Boulder	Bedrock		
-- %	-- %		

Substrate Compaction: low Sand: 30 %

Banks:

	Form	Height	Stability
Right	undercut	0.8 m	stable due to rooted vegetation
Left	undercut	0.4 m	stable due to rooted vegetation

Comments:

Good spawning habitat between 120 m and 150 m upstream from the lake.
Good rearing habitat noted throughout (overstream, vegetation, LOD, undercut banks, instream vegetation).

Lake: **LOWER MANSON**

System Name: **Manson River** **outlet**

Site Location: 100 m downstream from Lower Manson Lake

Date:	July 6, 1991	Time:	1530 hrs
Channel Width:	22 m	Water Temp.:	14.5° C
Wetted Width:	22 m	Stage (flow):	moderate
Max. Depth:	1.3 m	Velocity:	0.6 m/sec
Avg. Depth:	0.7 m	Field Gradient:	0.2 % (estimate)
Turbidity:	1.3 m	Colour:	slight tannic

Flood Signs:

Height: 0.2 m

Type: bank

Substrate Breakdown:

Fines	Small Gravel	Large Gravel	Cobble
10 %	5 %	40 %	45 %
Boulder	Bedrock		
-- %	-- %		

Substrate Compaction: low Sand: 10 %

Banks:

	Form	Height	Stability
Right	straight	0.4 m	stable due to rooted vegetation
Left	straight	1.2 m	stable due to rooted vegetation

Comments:

The initial 200 m of the outlet was investigated.

Good spawning and rearing habitat (undercut banks, LOD, overstream vegetation) noted throughout.